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Hybrid Marketing, Campaign Management, and Analytics' Last Mile Using SAS® Customer Intelligence 360

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ABSTRACT

The marketing industry has never had greater access to data than it does today. The more we know the customer, the more we understand the essence of customer experience. The more we understand customer experience, the more we can shape it, develop it, and better serve the customer.

According to Daniel Newman (Futurum Research) and Wilson Raj (SAS Institute) in the October 2019 research study Experience 2030:

"Brands must reinvent their operating models to act in the moment. They need a holistic data and technology strategy that they can individualize at scale, customer journey capabilities that can adapt in real time, and intelligent decisioning to automate the self-reinforcing cycle of tailored experiences. And that's just today. Tomorrow's customer journeys and personalization will be even smarter, more immersive, and more trust-enabling. More customer experience initiatives will be run by AI and machine learning algorithms embedded into automated software applications."

The question is: Are brands ready?

INTRODUCTION

The marketing industry has never had greater access to data than it does today. However, data alone does not drive your marketing organization. Decisions do. And with all the recent hype regarding the potential of AI, a successful cross-channel campaign is propelled by a personalized, data-driven approach that is injected with machine learning.



Figure 1. Data and Analytics For Better Decisions

According to the SAS Global Forum paper "A Hybrid Marketing Odyssey":

"Despite the challenges of complex data privacy regulations, rising consumer expectations, and always-on competition, marketing technology (MarTech) is now starting to deliver on many long-time promises such as one-to-one marketing and customer journey management.

But there are still hurdles to address. As consumers, we want businesses to consistently treat us as if they know us, regardless of the time, circumstances, or place. As marketing technologists, we want to leverage the flexibility afforded by Software as a Service (SaaS) and cloud computing, but we don't want to be the next business to be in the news for a data breach or a General Data Protection Regulation (GDPR) violation." (Bober and Hill, 2019)

Delving further, Futurum's October 2019 research study entitled "Experience 2030" provides insight on the current sentiment of consumer trust for brands, and how a lack of control erodes customer relationships. The report specifically states:

"Trust is a key element in the overall customer experience, and brands that cannot provide a high level of trust cannot provide a high level of customer experience.. This is a challenge for brands, as they work to balance the richness of the customer experience they can offer as a result of the user data they collect with the ever-present risk of a data breach (and the risk they know they face if their source of data is turned off)." (Newman and McClimans, 2019)

Hybrid marketing addresses these critical dissonances.

HYBRID MARKETING BACKGROUND

Hybrid marketing can be summarized by two areas:

1. Direct (or database) marketing
2. Digital marketing

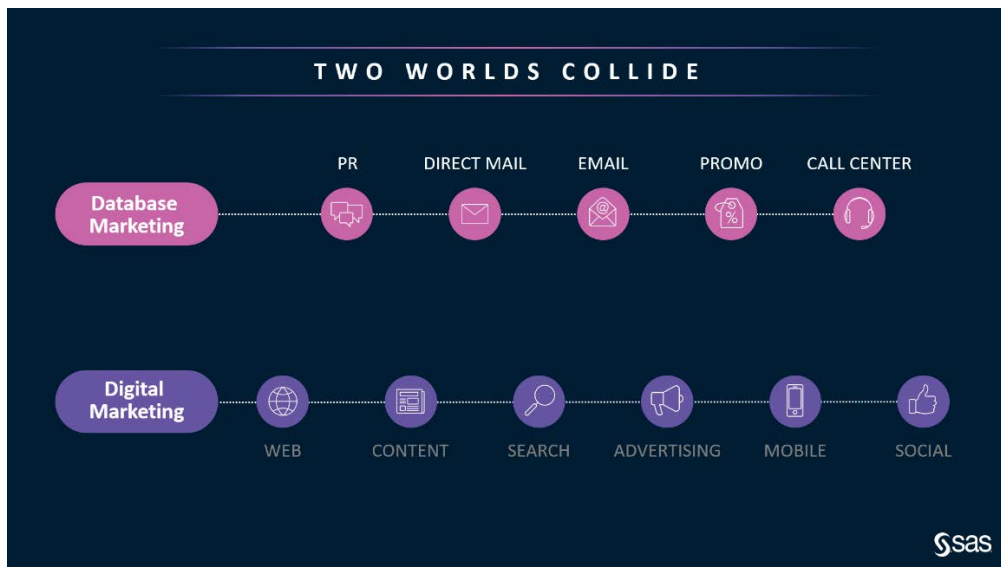


Figure 2. Database and Digital Marketing

The concept of integrated marketing evolved when digital marketing matured, and brands recognized these two disciplines could no longer operate in silos. Over the past decade, the industry hasn't fallen short of buzzwords to generate excitement about the potential.

This year, the concept of AI (or artificial intelligence) is a great example. Everyone is talking about it, but few really know how to do it. Everyone thinks everyone else is doing it, so

everyone claims they're doing it. Unfortunately, a lot of what one hears about AI is sensationalized. Indeed, AI is over-hyped. But AI is also real and powerful, and the marketing industry is craving it.

However, customers don't care how complicated and convoluted the marketing technology ecosystem is. The frustration with the industry overall has led to personal privacy legislation, such as GDPR and CCPA, which places more responsibility on brands to protect **their customers' data.** So, how can marketers interact with their customers and prospects in a respectful, yet personal manner?

Hybrid marketing combines the capabilities of direct and digital marketing in a single platform. Organizational silos break down, enabling analysts and channel managers to leverage online and offline data to improve both customer journeys, and the efficacy of their efforts.

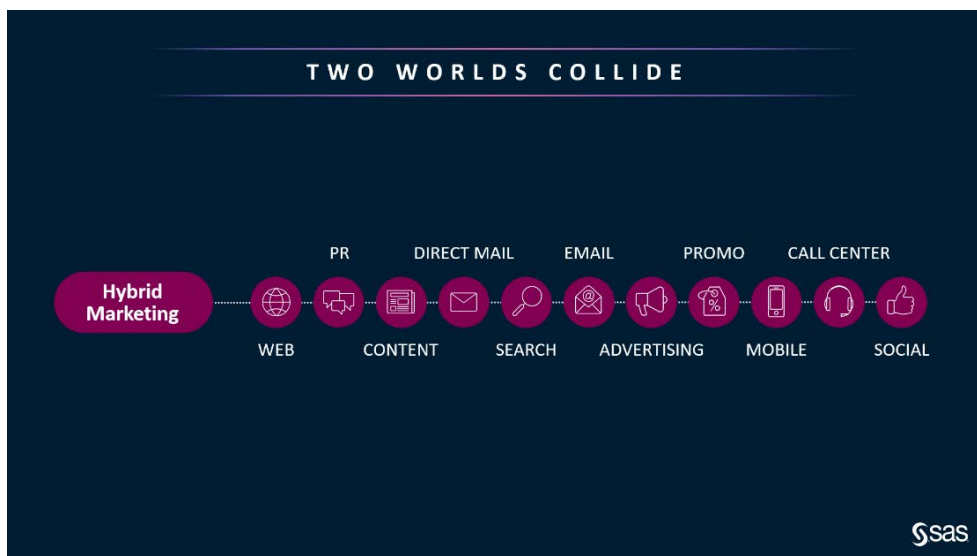


Figure 3. Two Worlds Collide to Form Hybrid Marketing

HOW DOES HYBRID MARKETING WORK?

There are two important considerations when a technology vendor requires a brand to on-board their managed customer data and intellectual property into a cloud solution:

1. data duplication
2. synchronization

Unless your brand is moving all of their operational and marketing systems to a single location, this will always be a challenge. Instead of requiring brands to go down this path, SAS[®] Customer Intelligence 360 provides a secure web socket-based connection between your chosen data management environment and the SAS[®] marketing cloud platform.



Figure 4. SAS Customer Intelligence 360 - Hybrid Marketing and Platform Capabilities

In Figure 5, the connections, which are labeled as an API gateway of agents, provide a plug-in SDK framework that allows integration with any external system. You can learn more about the agent framework by reading “Using the SAS Customer Intelligence 360 Hybrid Cloud Capabilities for True Omnichannel Marketing” (Tsuboi and Cuppet, 2017).

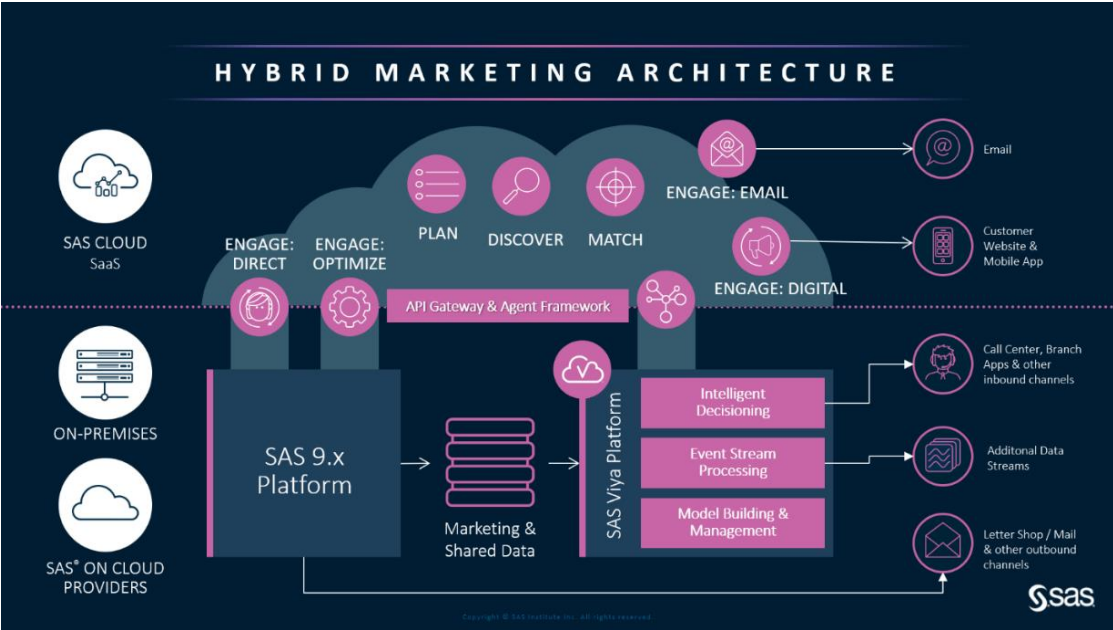


Figure 5. SAS Customer Intelligence 360 - Hybrid Marketing Architecture

Rather than requiring the movement and duplication of any of your brand’s managed first-party customer data to SAS Customer Intelligence 360, the hybrid marketing design allows you to map a customer identity from your data repository to an anonymous hashed identity in the SAS marketing cloud platform. For clarity, your managed environment can be on-premises, hosted by another company, or stored in a cloud system. It’s your choice and you control your data.

Let's look at a segmentation example for multi-touchpoint targeting. A brand has a large volume of customers in their on-premise database, including customers Suneel and Jeri. They are active customers, have opted-in for email communications, have interacted with the brand online in the last 30 days, and have been scored by a machine learning model for their propensity to convert.

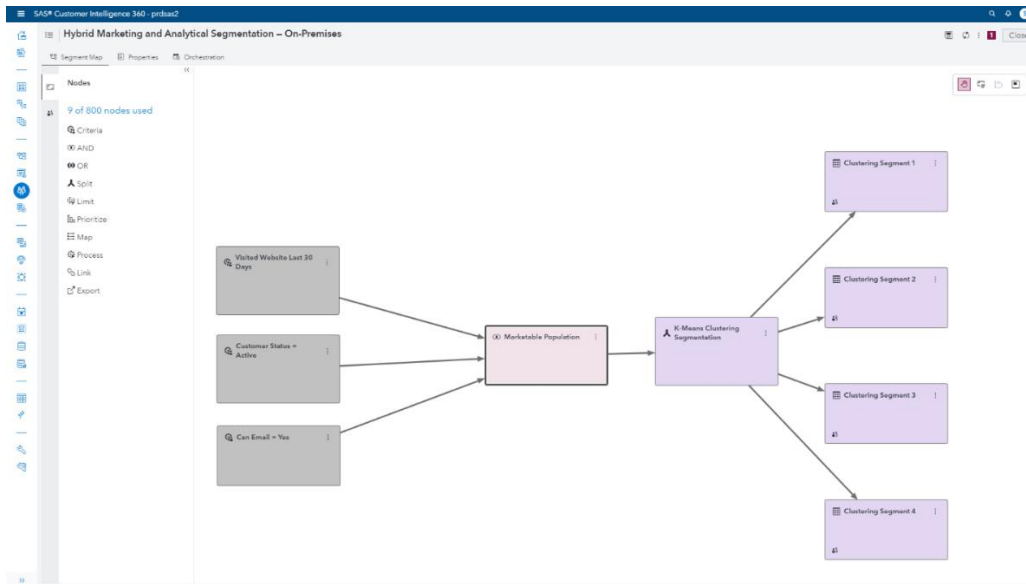


Figure 6. SAS Customer Intelligence 360 - Segmentation

As with most customer relationship management (CRM) databases, countless attributes are available ranging from demographics, psychographics, house-holding, transactions, analytical scores, third-party appends, and so on. Historically, what's been missing in these environments is the availability of structured online user behavior, which has typically been in a silo within an external cloud platform. Not anymore.

Input Node	Count
Can Email = Yes	
Visited Website Last 30 Days	
Customer Status = Active	

Figure 7. SAS Customer Intelligence 360 - Creating a Marketable Population for Segmentation

A key value proposition here is that there are no personal identifiers for either Suneel or Jeri in SAS Customer Intelligence 360. Instead, they are mapped by anonymous IDs, ABC123 for Suneel and XYZ789 for Jeri. If a marketer wants to target a segment, the platform can query **information residing in the brand's CRM**-managed database and leverage cloud-stored data captured from owned digital properties (such as web or mobile app).

This process is similar to traditional campaign management (or marketing automation) processes. The difference is that instead of requiring your organization to duplicate all your **first-party offline data in the vendor's cloud solution, the individuals who meet your use**

case's targeting criteria are simply mapped to a *segment* in SAS Customer Intelligence 360. No Suneel, no Jeri, no other personal information about them, just ABC123 and XYZ789, along with other customer-linked anonymous identities that are now associated with your defined segment.

HYBRID MARKETING AND ANALYTICS

Another differentiator in favor of hybrid marketing is the availability of your preferred machine learning technology to add value to your campaign management workflow. It's no longer a debate that analytically driven decisions are better in deriving measurable impact.

The hype behind AI is primarily focused on augmenting decisions, process, natural language processing, and computer vision. The result is a set of trends made up of these features:

- algorithms producing better analytics and accuracy
- automation of machine learning aligned with greater productivity
- embedded analytics, making AI more impactful and consumable
- human-like interfaces, creating approachability

What happens when AI becomes useful for your brand? It can effectively be renamed from "artificial intelligence" to "analytical integration," into any internal process or external customer experience that your organization facilitates. But the lack of factors such as these present barriers to AI adoption:

- talent
- stakeholder buy-in
- end-to-end solutions
- data strategy

Transforming hype into reality for AI must focus on data, discovery, and deployment. Brands cannot survive on classroom science projects. Taking action enabled by AI-enhanced decisions completes the enviable last mile of embedding analytics into personalization strategies using experimentation and testing, recommendation systems, next-best-actions, attribution, segmentation, and journey optimization.

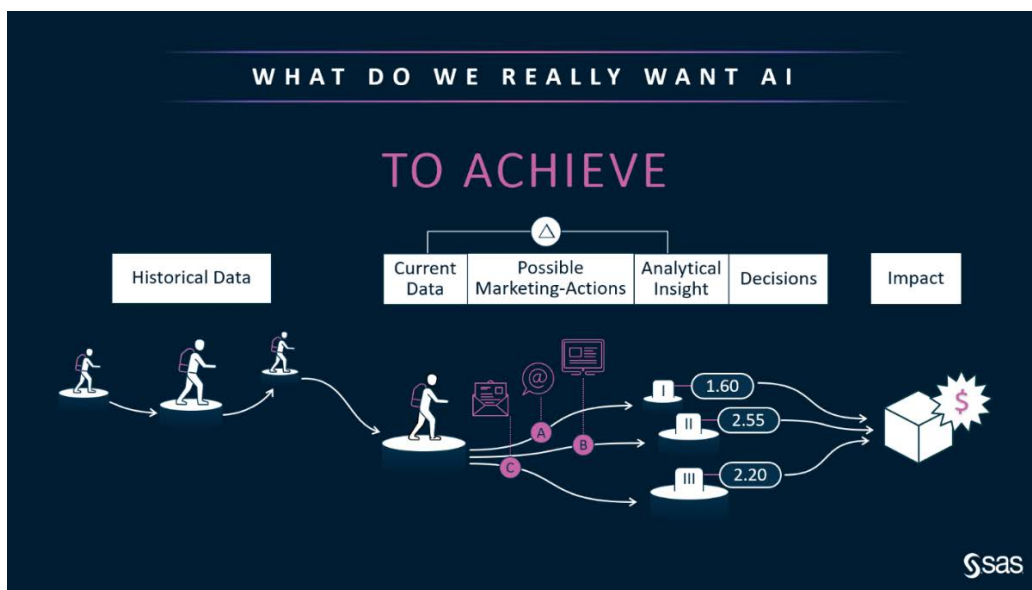


Figure 8. SAS Customer Intelligence 360 – What Do We Really Want AI to Achieve?

Going back to our segmentation example, let's take a closer look at the influence of machine learning in the campaign management process. In Figure 6, the last step of the segment mapping was applying algorithmic clustering for unsupervised segmentation. But how were these clusters created?

Within SAS, analysts can perform artisanal modeling using no-code, low-code, and high-code user interfaces. Given that customer behavior when working with segmentation varies **over time, there isn't one algorithm that rules them all**. You can choose from a variety of techniques for both supervised and unsupervised approaches.

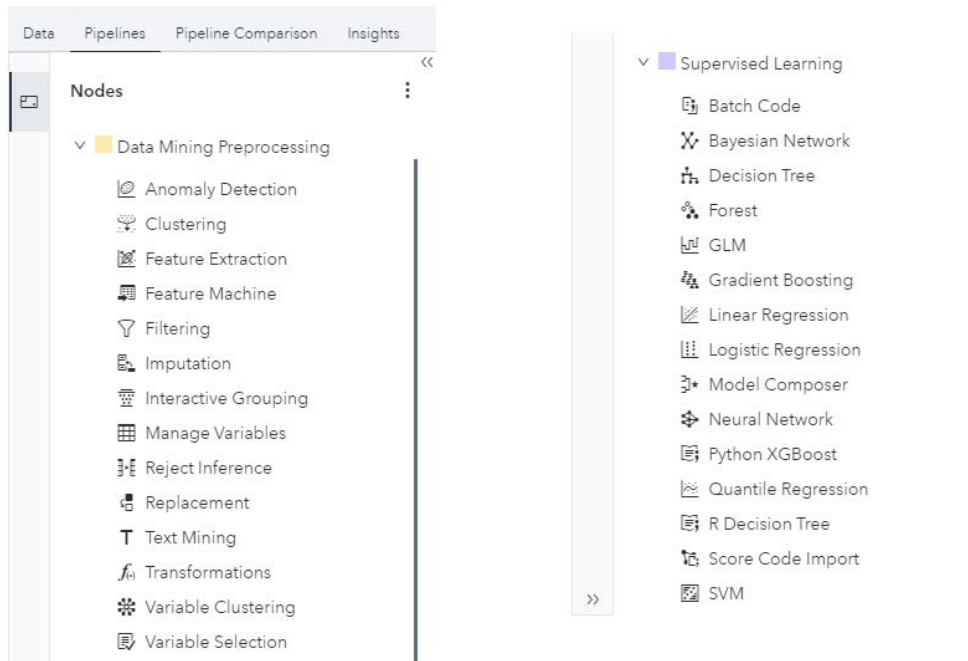


Figure 9. SAS Customer Intelligence 360 and SAS® Visual Data Mining and Machine Learning – Supervised and Unsupervised Algorithms

UNSUPERVISED SEGMENTATION AND K-MEANS CLUSTERING

Clustering is a method of unsupervised segmentation that puts observations into groups that are suggested by the data. The observations in each cluster tend to be similar in some measurable way, and observations in different clusters tend to be dissimilar. Observations are assigned to exactly one cluster. From the clustering analysis, you can generate a cluster ID variable to tag customers for use in campaign management processes.

You can use the KCLUS procedure to read and write data in distributed form, and to perform clustering and scoring in parallel by making full use of multicore computers or distributed computing environments. The KCLUS procedure performs a cluster analysis on the basis of distances that are computed from quantitative or qualitative variables (or both).

The KCLUS procedure uses the *k*-means algorithm for clustering interval input variables, uses the *k*-modes algorithm for clustering nominal input variables, and uses *k*-prototypes algorithm for clustering mixed input that contains both interval and nominal variables.

The KCLUS procedure accomplishes the clustering by updating the cluster centroids and the cluster membership of the data iteratively until the convergence criterion (for example, the least squares criterion for the Euclidean distance in *k*-means clustering) is satisfied or until the maximum iteration number is reached.

Let's walk through an example of visual k-means clustering that transparently showcases how the results are derived and made available for use by SAS Customer Intelligence 360. The first step is to select the analysis object and drop it into the workspace.

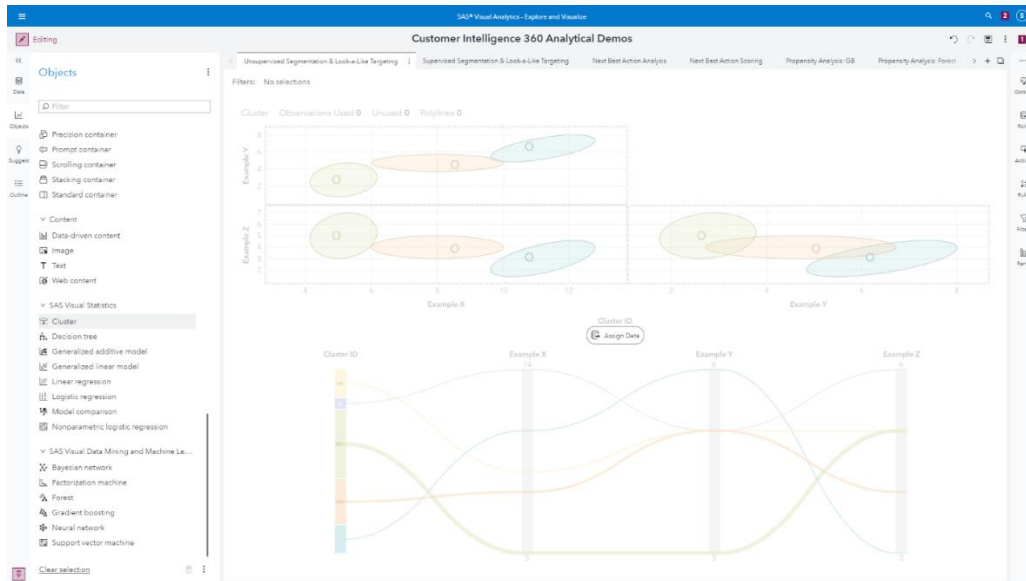


Figure 10. SAS Visual Statistics – Clustering Visual Analysis Object

Next, we assign attributes to roles, customize model properties (if desired), and execute the model in order to provide results. In this example, the following attributes are fed into the analysis.

- customer age
- customer tenure (years)
- mobile app sessions (last 30 days)
- website visits (last 30 days)
- email interactions (last 30 days)

We want to identify unsupervised synergies that help explain segment behavior across these online and off line signals. The results include two interactive visualizations that are worth highlighting.

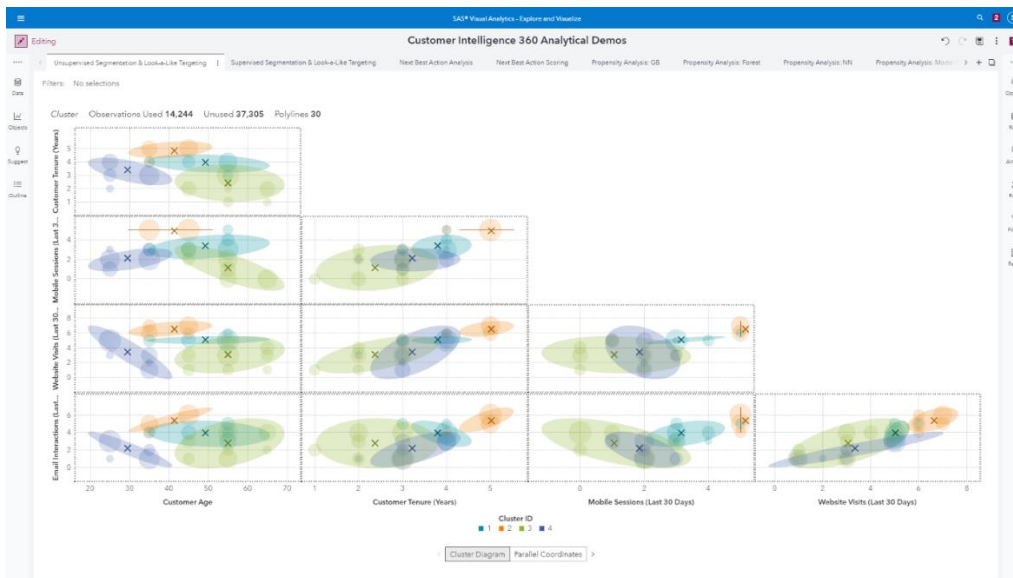


Figure 11. SAS Customer Intelligence 360 and SAS® Visual Statistics – Clustering Diagram

The cluster diagram (or matrix) displays a two-dimensional visualization of each cluster onto a specified number of effect pairs. These projections are useful for spotting cluster similarities and differences within the plots. Each cluster is assigned a unique color. Although each cluster is unique in n-space, the two-dimensional projections overlap. It is important to note that each observation (or customer) belongs to only one cluster.

Interacting with the diagram allows us to improve our understanding of any plotted effect pair.



Figure 12. SAS Customer Intelligence 360 and SAS Visual Statistics – Plotted Effect Pairs

The interpretation of the relationship between customer age and the number of website interactions highlights the fact that four unique segments exist, and that two clusters (representing two different age groups) display moderate to lower levels of web engagement. We can place our pointer over any centroid and obtain displays of each cluster's mean values for the effect pair.

But what about the "data story" of each cluster? Let's introduce the parallel coordinates plot that enables us to accelerate the understanding of each cluster's trends. The plot displays data as lines that are moving through categories and binned measures. The thickness of a line indicates the relative number of observations in that bin.

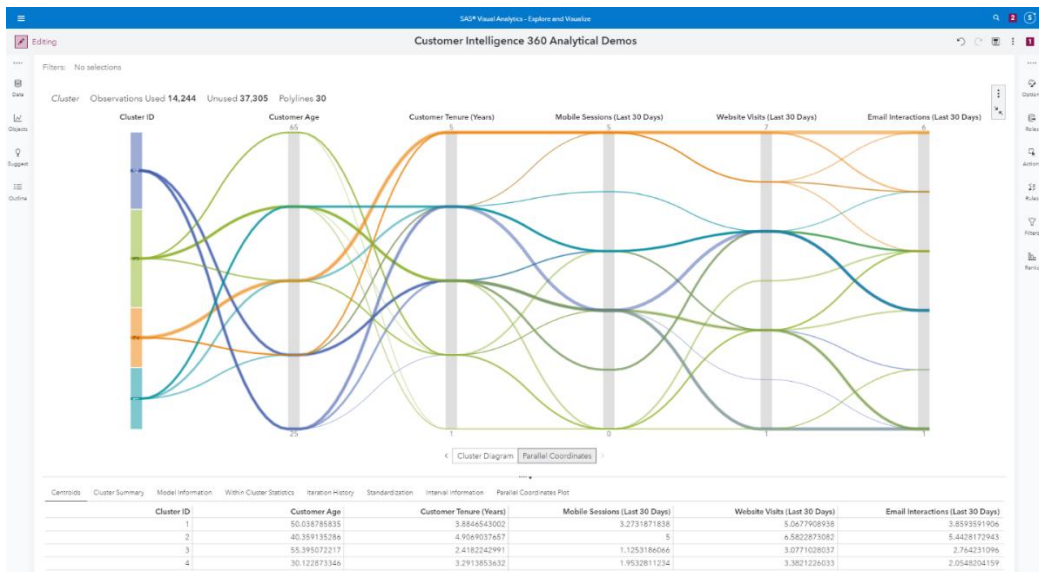


Figure 13. SAS Customer Intelligence 360 and SAS Visual Statistics – Parallel Coordinates Plot

Wait a minute. This looks like spaghetti. How is this helpful?

We can interactively restrict the active lines to one or more bins in order to focus on only the data that interests us. In addition, we can adjust the plot to explore the data based on cluster membership, a specified range for one or more variables, or both.

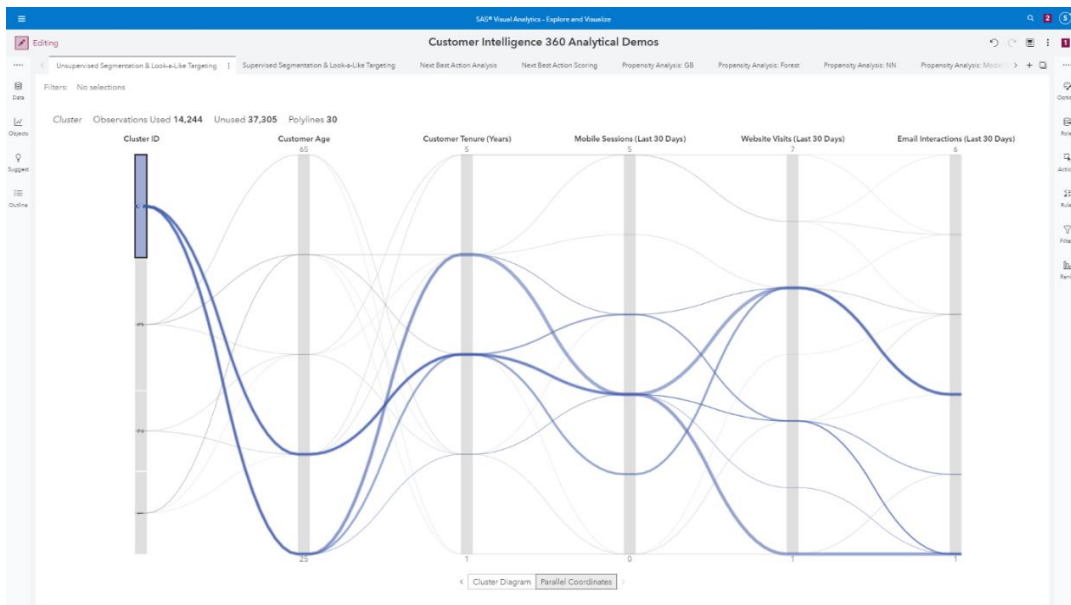


Figure 14. SAS Customer Intelligence 360 and SAS Visual Statistics – Parallel Coordinates Plot and Isolating Cluster 4

A single click with the visual plot allows us to focus on Cluster 4. The interpretation (or story) is that this group skews to a younger age, moderate tenure, and low to medium engagement levels across web, mobile, and email touchpoints.

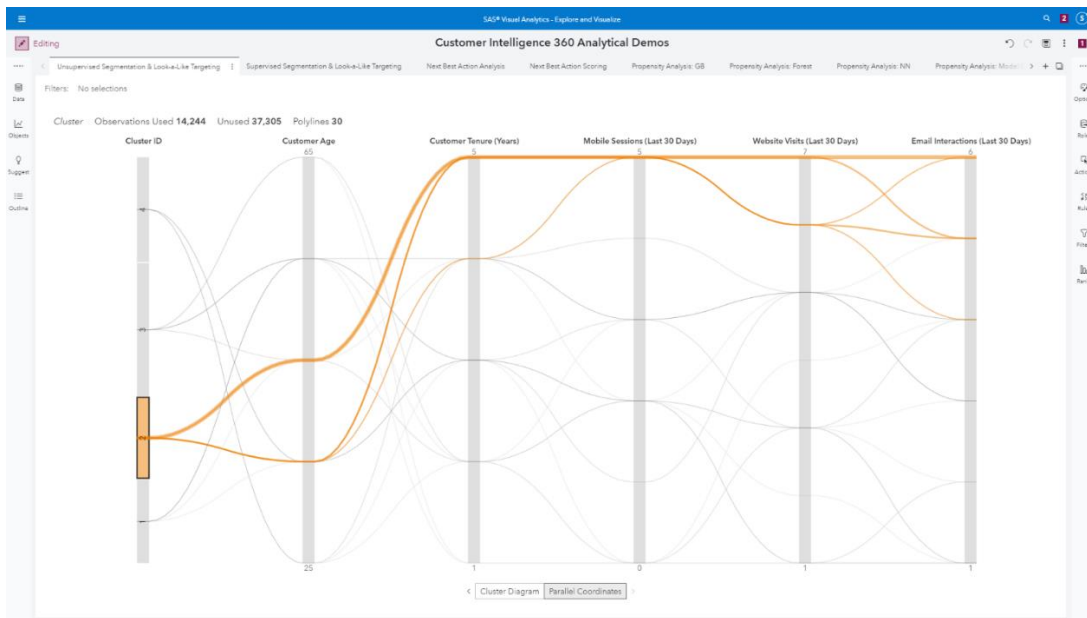


Figure 15. SAS Customer Intelligence 360 and SAS Visual Statistics – Parallel Coordinates Plot and Isolating Cluster 2

Another click leads us to focus on Cluster 2. The interpretation here is a group that is aged 35-45 years, with high values of tenure and digital touchpoint engagement. The interactivity **doesn't end there**. We can select the vertical bar that represents age distribution and further filter on customers 40 years of age or greater.



Figure 16. SAS Customer Intelligence 360 and SAS Visual Statistics – Parallel Coordinates Plot and Isolating Cluster 2 Aged 40 Years or Greater

Let's assume we're feeling confident about the results of our clustering analysis. Before transitioning to sharing the results with marketing teams who manage and deliver campaigns across touch points, **let's walk through a supervised segmentation use case.**

SUPERVISED SEGMENTATION AND AUTOMATED AI

One topic is certain, no matter where you fall on this list:

- data engineer
- business analyst
- citizen data scientist
- data scientist
- statistician
- executive

We all love data. It's beautiful, surprising, inspiring, emotive, compelling, and persuasive. Data is power. But we feel these emotions only **when we arrive at the famous "ah-ha"** moment of analysis that makes us leap out of our seats!

However, I never hear clients express how much free time they have. What I hear is typically centered on not having enough resources or talent to meet objectives. What if we **could accelerate to "ah-ha" moments without sacrificing quality?**

SAS has been investing in research and development efforts around analytical automation that is designed to support the needs of everyone from business analysts and citizen data scientists to statisticians and data scientists. The question we want to address is what makes analytical automation useful in assisting people who are making or influencing changes to improve performance outcomes?

At the end of the day, anyone working with data has the potential to persuade decision makers. According to **"AI is Coming for Your BI: Automated Analysis in SAS Visual Analytics"** (Styll, 2019), there is a confluence of trends that is driving the demand, feasibility, and availability of automated analysis.

- The size of data is growing (from sensors, websites, apps, social, external, and so on).
- The awareness of the value that predictive analytics and machine learning enables has soared.
- Data scientists and available time are in limited supply.
- High-performance computing now enables interactive modeling on very large volumes of data.
- Cloud infrastructure and technology has reduced costs and deployment times dramatically.
- Natural language processing is making conversational analytics a reality.

Let's walk through an analysis that combines automated machine learning and natural language explanations of the supervised segmentation results. The objective is to derive actionable audiences who have higher propensities to meet our **brand's conversion goal** (which is a revenue-driving event). This effort provides guidance on who qualifies for marketing tactics like retargeting, personalization, and testing. In other words, we can determine which segments are worth targeting with our **limited resources and which aren't.**

The first step is to right-click the attribute in our data that represents the conversion event of interest and select Explain.

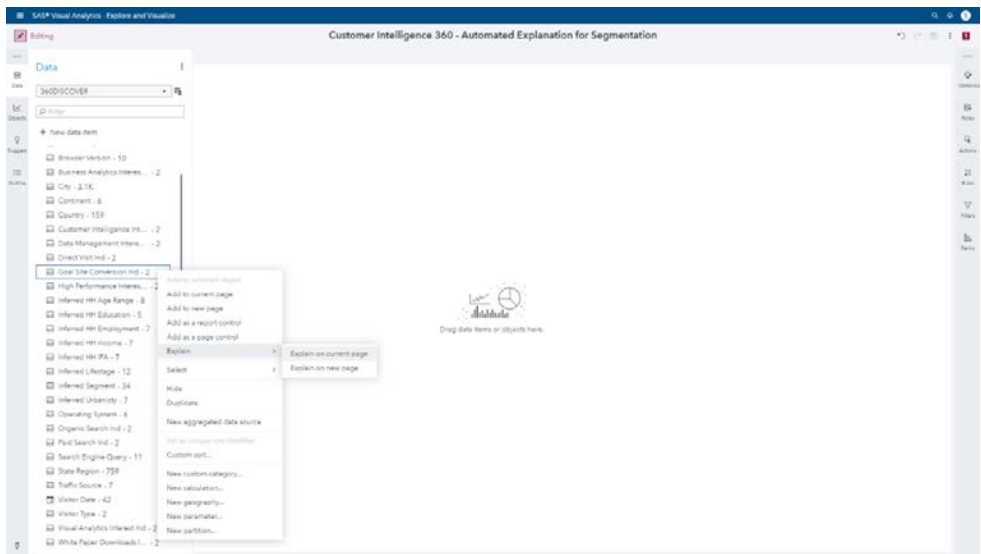


Figure 17. SAS Customer Intelligence 360 and SAS Visual Analytics – Automated Explanation for Segmentation in a Single Click

Automated explanation quickly determines the most important underlying factors (or predictors) for the conversion outcome by analyzing all the rows and columns of the input data.

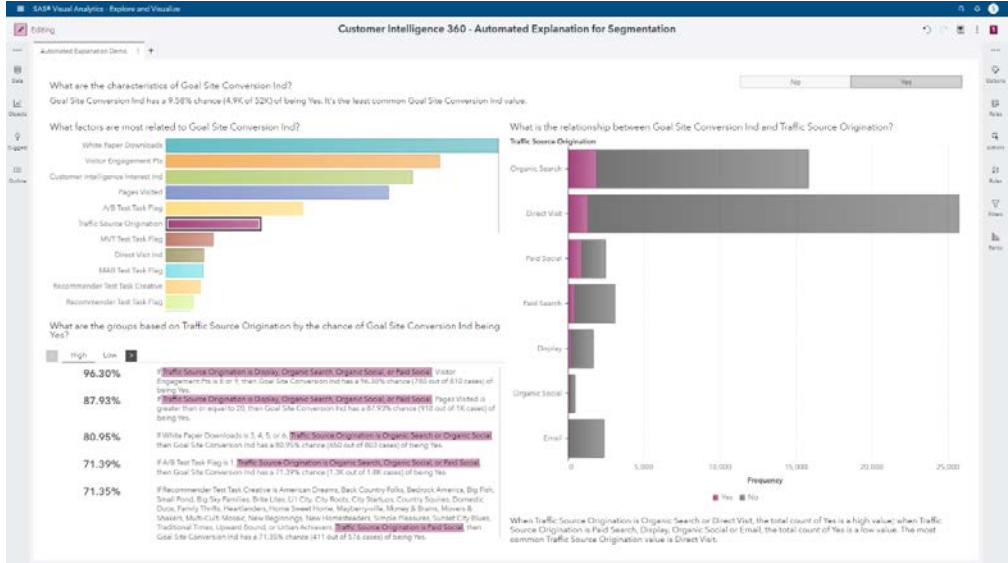


Figure 18. SAS Customer Intelligence 360 and SAS Visual Analytics – Automated Explanation for Segmentation Results

At the top of the page in SAS Customer Intelligence 360, a natural-language-generated overview of *Goal Site Conversion Ind* is displayed, including both the percentage of observations that converted and comparative details to other values represented within this **attribute's** distribution.

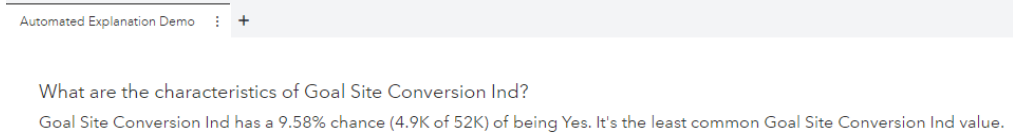


Figure 19. SAS Customer Intelligence 360 and SAS Visual Analytics – Automated

Explanation Overview of Target Metric

Below the overview text section, color-coded factors are displayed on a horizontal bar chart, visualizing **the relative importance of each attribute's influence of Goal Site Conversion Ind.** The most important predictors appear on the top, and the predictors are displayed in descending order by weight. The weights are determined by one-level algorithmic decision trees. Placing our pointer over each bar interactively generates a pop-up display of the relative importance score, standardized between one and zero to simplify interpretation (higher values equate to more influence).

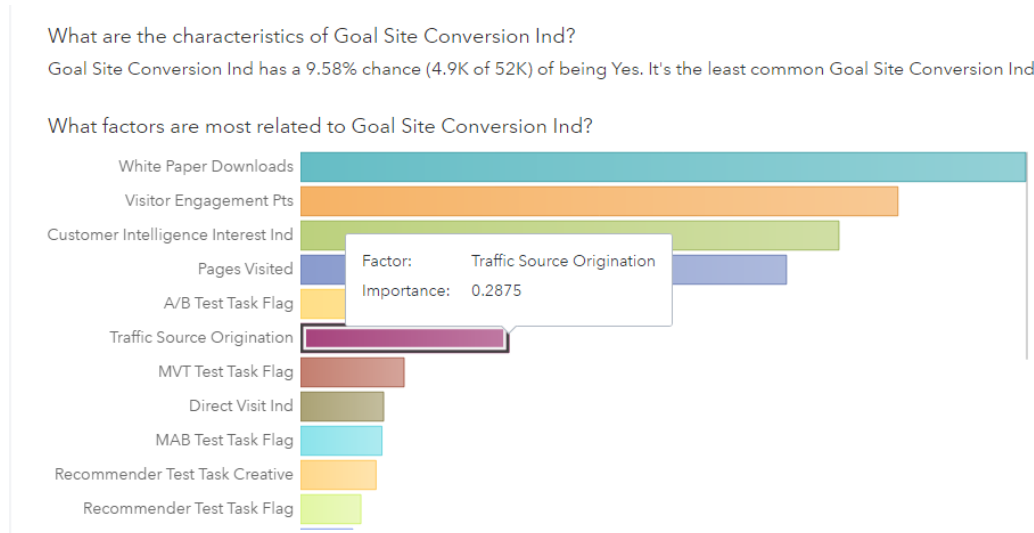


Figure 20. SAS Customer Intelligence 360 and SAS Visual Analytics – Automated Explanation of Relevant Factors

Now that we know which factors influence *Goal Site Conversion Ind*, how can we determine which data values of these important factors lead to higher or lower conversion propensities? When we select a data item like *Goal Site Conversion Ind* to be analyzed, the automated analysis results display a list of attractive segments. These homogeneous groups receive natural language descriptions that are based on recipes of influential factors that contain specific values.

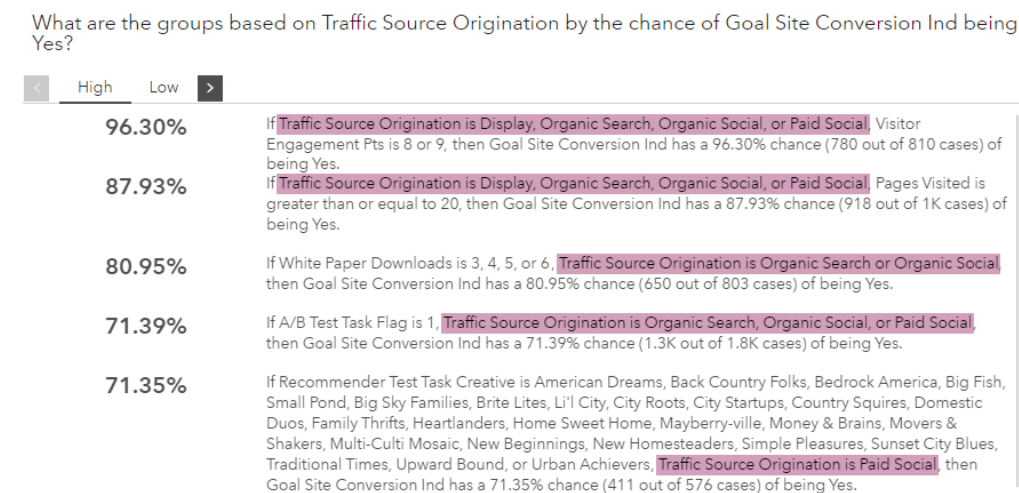


Figure 21. SAS Customer Intelligence 360 and SAS Visual Analytics – Natural Language Descriptions of Attractive Segments

In this example, multi-level (as opposed to single-level) C4.5 decision trees are executed to identify each of the segments that are performing at high conversion rates, and we can review the explanations to assess the audience profiles. Because we selected the factor *Traffic Source Origination*, all influential values related to this attribute are contextually highlighted in purple. Not only can we see the impact of the selected factor, but we can also see how other factors interact with it to identify high value segments.

Alternatively, if we are interested in low value segments, clicking the Low filter presents those audiences.

What are the groups based on Traffic Source Origination by the chance of Goal Site Conversion Ind being Yes?

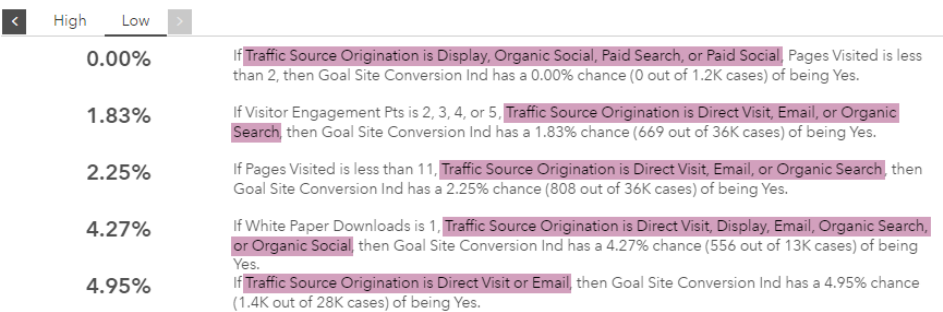
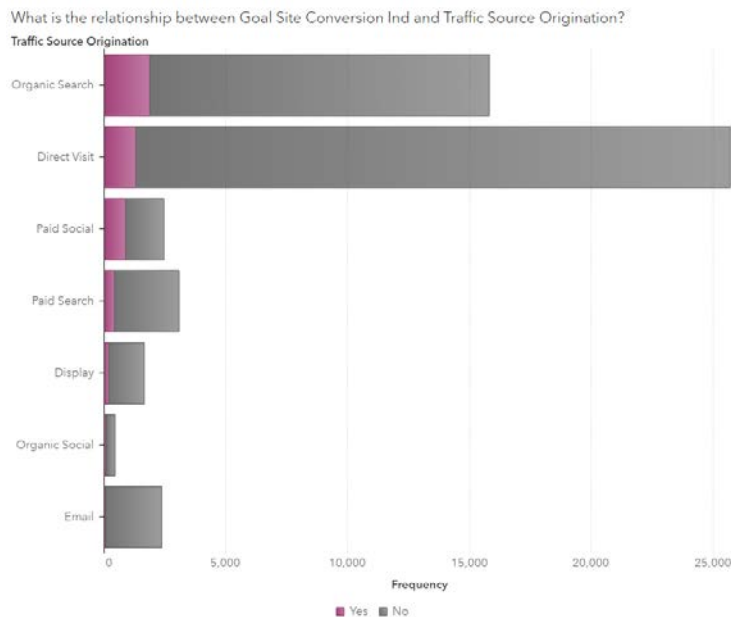


Figure 22. SAS Customer Intelligence 360 and SAS Visual Analytics – Natural Language Descriptions of Unattractive Segments

Moving on, we want to explore the bivariate relationships of factors with *Goal Site Conversion Ind* in more detail to assist in both interpretation and presentation storytelling. The last visualization appears on the right side of the report, and highlights the interaction effect of a selected factor with *Goal Site Conversion Ind*.



When Traffic Source Origination is Organic Search or Direct Visit, the total count of Yes is a high value; when Traffic Source Origination is Paid Search, Display, Organic Social or Email, the total count of Yes is a low value. The most common Traffic Source Origination value is Direct Visit.

Figure 23. SAS Customer Intelligence 360 and SAS Visual Analytics – Interactive Bivariate Analysis Between Conversions and Selected Factor

We can review the natural language explanations of the visualization and interactively select other influential factors. In the next example, we select the factor *Customer Intelligence Page View*, which changes other visualizations to help us improve our understanding of the influence it has on *Goal Site Conversion Ind* and the impact on identifying attractive segments.

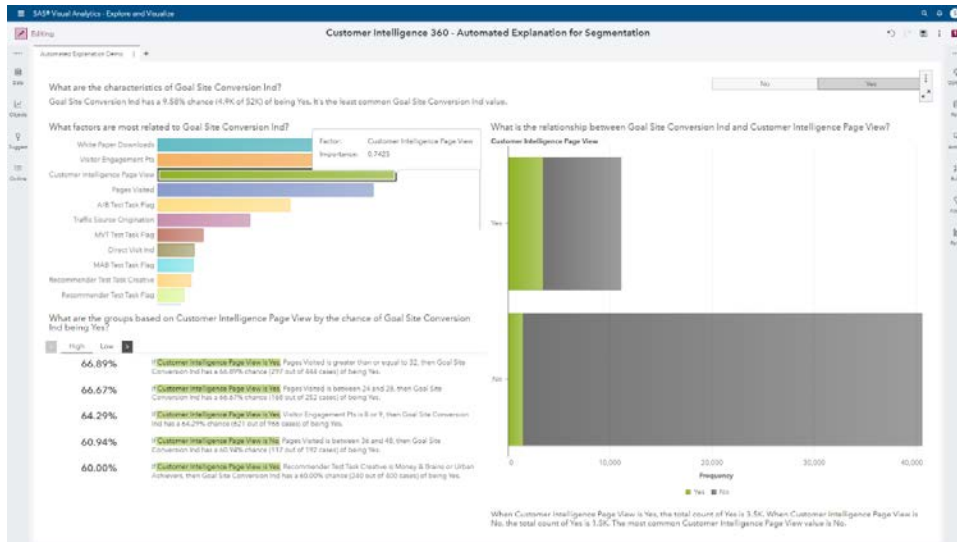


Figure 23. SAS Customer Intelligence 360 and SAS Visual Analytics – Interactively Explore Other Relationships

A powerful feature in SAS is the ability to increase analysis sophistication. These are two examples we highlight:

1. Switching the underlying algorithm of the segmentation analysis.
2. Leveraging model auto tuning (or hyperparameters).

To begin, we open a menu to duplicate our automated analysis to any of the listed techniques.

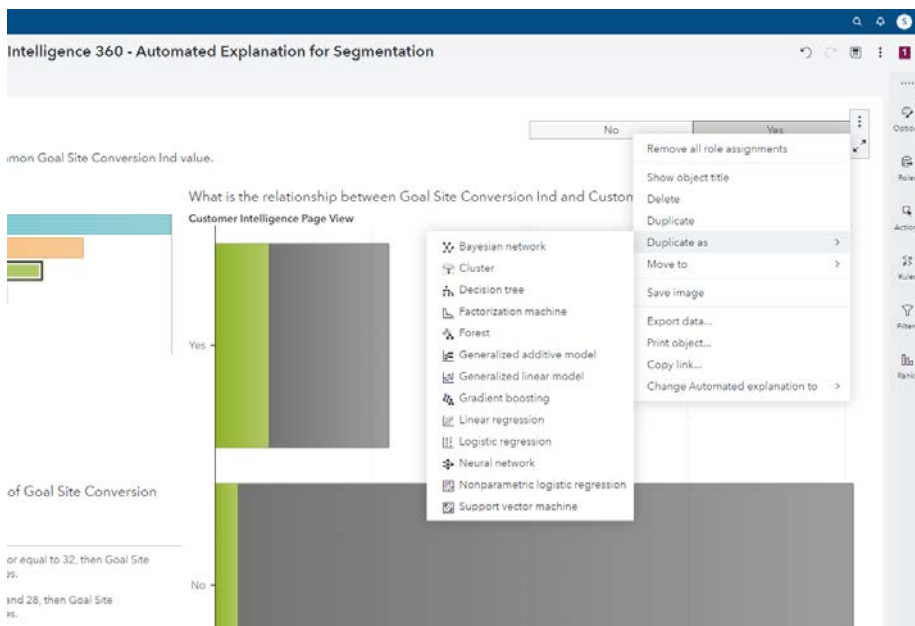


Figure 24. SAS Customer Intelligence 360 and SAS Visual Analytics – Switching

Analysis Algorithms

Although we can select any method, we use a decision tree in order to show how we can further optimize the effectiveness of our work. If you are interested in other machine learning techniques, such as forests, gradient boosting, or neural networks for classification use cases, refer to “SAS Customer Intelligence 360: Decision management, machine learning, and digital marketing” (Grover 2018). If you're curious to learn more about factorization machines for recommendation systems, see to “Factorization Machines, Visual Analytics, and Personalized Marketing” (Grover 2019).

After selecting the decision tree, we can visually assess the diagnostic metrics, but we also can also improve the segmentation. Let's begin by reviewing the initial results.

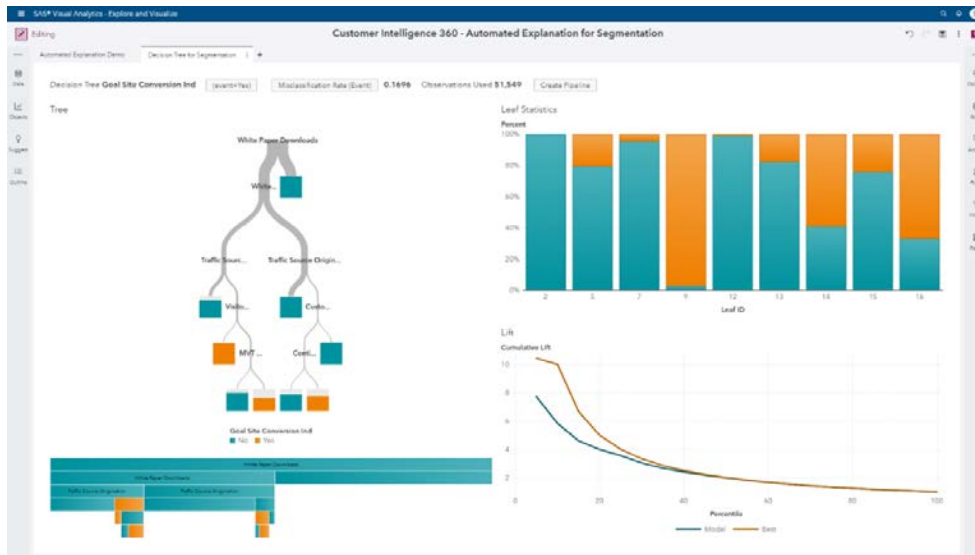


Figure 25. SAS Customer Intelligence 360 and SAS Visual Statistics – Algorithmic Decision Tree

In short, this output highlights nine segments with varying propensities to convert (or not convert) based on our *Goal Site Conversion Ind* target metric. By enlarging the segment leaf plot, we can view which segments have attractive signals. The bars with larger proportions of orange color represent audiences with higher conversion propensities.

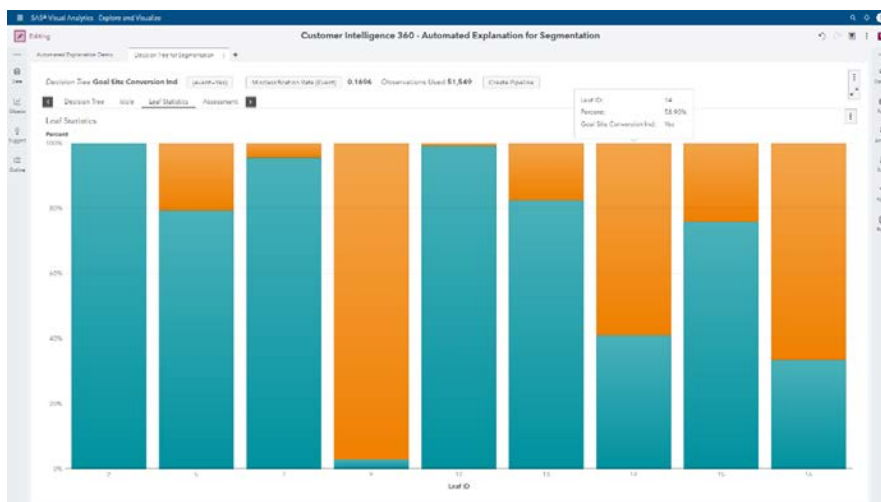


Figure 26. SAS Customer Intelligence 360 and SAS Visual Statistics – Segment Leaf Plot

If we select a specific segment, the tree map interactively provides more context of the audience.

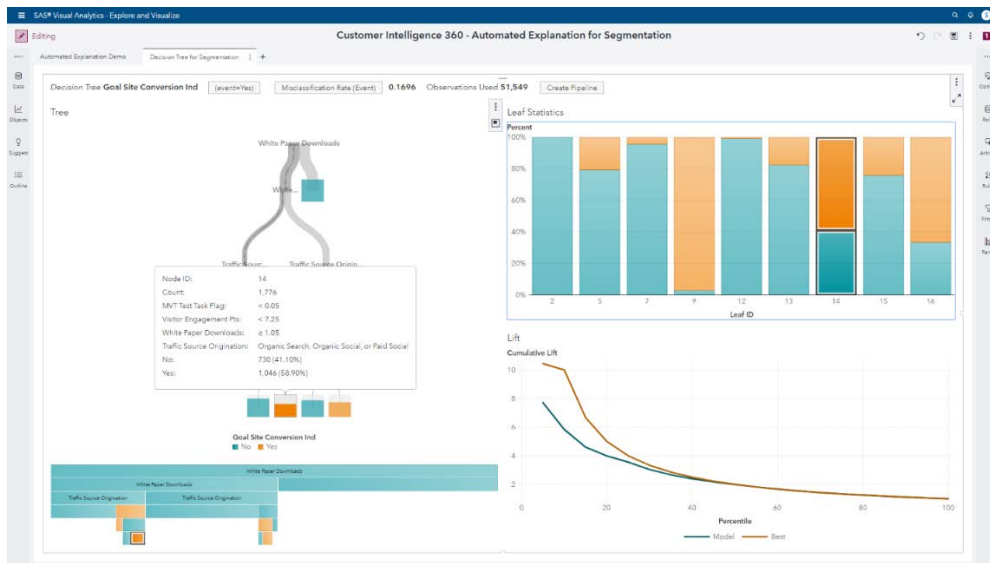


Figure 27. SAS Customer Intelligence 360 and SAS Visual Statistics – Decision Tree Map and Audience Profiling

We also desire stability in our work, and we can turn on analytical model partitioning in a snap. This helps ensure the segmentation results will perform similarly on scoring new audiences.

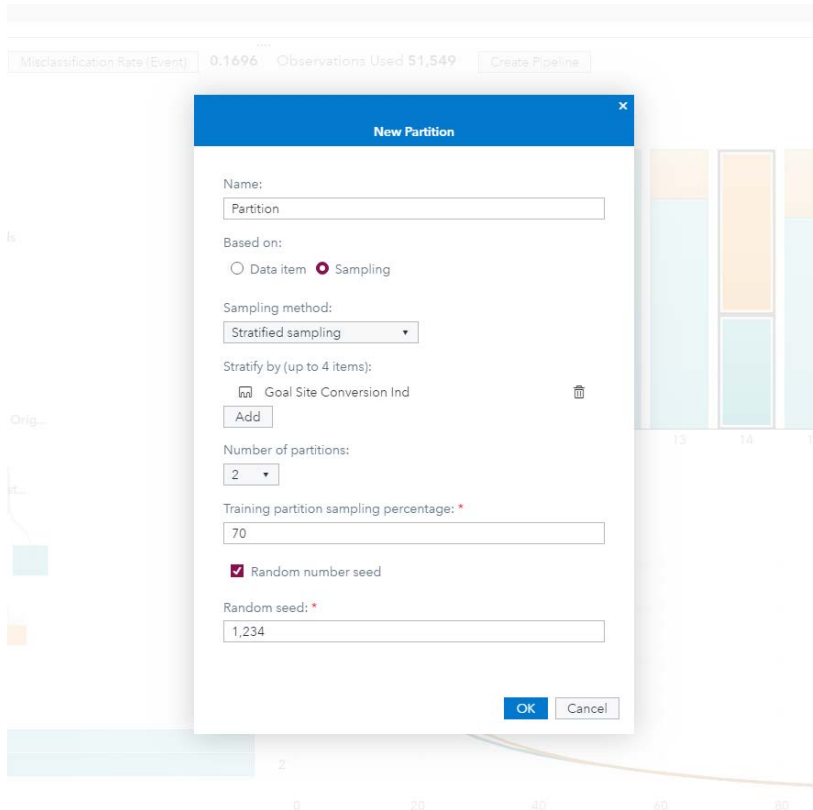


Figure 28. SAS Customer Intelligence 360 and SAS Visual Statistics – Model Partitioning

A new challenge will inevitably present itself. The tree's diagnostic metric of misclassification rate haunts us and our efficiency in delivering results. In our current example, we have an error rate of approximately 17%. The analyst delivering this segmentation for use in campaign management processes will naturally want to improve the accuracy of the predictions. However, this can become a time-consuming exercise of manual iterations of tinkering with the analysis, which delays the delivery of the results.

Decision Tree Goal Site Conversion Ind (event=Yes) Misclassification Rate (Event) 0.1696

Figure 29. SAS Customer Intelligence 360 and SAS Visual Statistics – Misclassification Rate

Once again, we can do better with automation.

To create a good segmentation model, many choices must be made when deciding on algorithms and their parameters. The usual approach is to apply trial-and-error methods to find the optimal algorithms for the problem at hand. Often, an analyst chooses algorithms based on practical experience and personal preferences. This is reasonable, because there is usually no unique solution to creating a machine learning model. Many algorithms have been developed to automate the manual and tedious steps of the analytical process. Still, it requires a lot of time and effort to build a machine learning model with trustworthy results.

A large portion of this manual work relates to finding the optimal set of hyperparameters for a chosen modeling algorithm (in our use case, the decision tree). Hyperparameters are the properties that define the model that are applied to a data set for use in automated information extraction.

In our example, we must make many decisions during the training process. A large portion of the segmentation model building process is taken up by experiments to identify the optimal set of parameters for the algorithm. As algorithms get more complex (single-layer to multi-layer neural networks, decision trees to forests and gradient boosting), the amount of time required to identify these parameters grows.

There are several ways to support analysts in the cumbersome work of tuning model parameters. These approaches are called hyperparameter optimization, or auto tuning. Not only do ideal settings for the hyperparameters dictate the performance of the model's training process, but, more importantly, they govern the quality of the resulting segmentation model. In a single click, an analyst can trigger the auto tuning optimization, which automates the removal of countless attempts to improve the segmentation analysis.

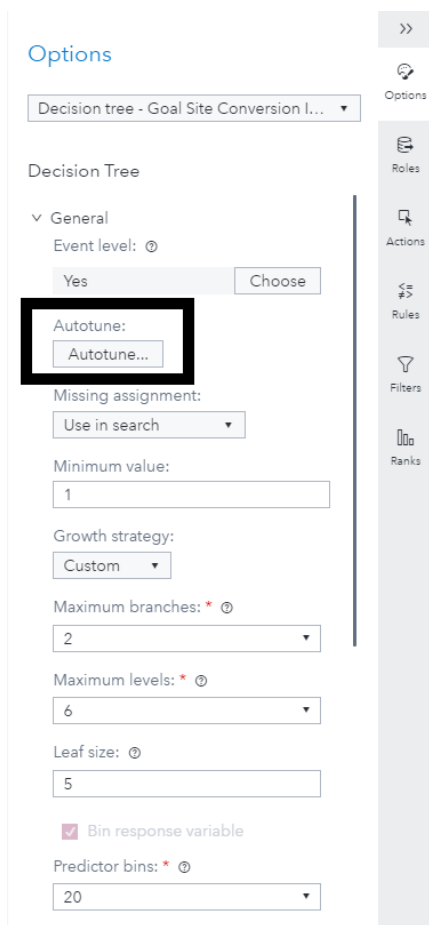


Figure 30. SAS Customer Intelligence 360 and SAS Visual Data Mining and Machine Learning – Auto Tune Hyperparameters

In general, there are three different types of auto tuning methods: parameter sweep, random search, and parameter optimization.

1. **Parameter sweep:** This is an exhaustive search through a predefined set of parameter values. The analyst selects the candidates of values for each parameter to tune, trains a model with each possible combination, and selects the best-performing model. Here, the outcome very much depends on the experience and selection of the analyst.
2. **Random search:** This is a search through a set of randomly selected sets of values for the model parameters. With modern computers, this can provide a less biased approach to finding an optimal set of parameters for the selected model. Because this is a random search, it is possible to miss the optimal set unless a sufficient number of experiments are conducted.
3. **Parameter optimization:** This approach applies modern optimization techniques in order to find the optimal solution. It's the best and least expensive way to find the most appropriate set of parameters for any predictive model or any business problem.

SAS provides analysts a hybrid, derivative-free optimization framework that operates in a parallel and distributed computing environment to overcome the challenges and computational expense of hyperparameter optimization. It consists of an extendable suite of search methods.

Clicking Auto Tune has a formidable impact on our segmentation analysis. The **misclassification rate decreases from 17% to approximately 9%.** That’s an **8% increase in predictive accuracy**, based on the validation partition of the input data. In other words, more accuracy translates to improved conversion rates downstream.



Figure 31. SAS Customer Intelligence 360 and SAS Visual Data Mining and Machine Learning – Algorithmic Decision Tree with Auto Tuning

Incremental lift was derived from audience deciles, as well as from the identification of more attractive segments. The auto tuning helped the tree create thirty segments in total. Before leveraging this feature, our previous iteration of the tree analysis identified three segments with high-value propensities to convert. Now we have ten segments with favorable behaviors available for audience targeting and personalization.



Figure 32. SAS Customer Intelligence 360 and SAS Visual Data Mining and Machine Learning – Auto Tuned Segment Discovery

Analysts reading this who do not have access to auto tuning in their current analytical environments will appreciate the hours and days that could be saved to reach this ideal outcome.

COMPLETING ANALYTICS’ LAST MILE

How can we turn our insights into actions? Without a clear path to action, there is no finish line to deriving business value.

To conclude this process, **let's** focus on these actions:

1. Targeting attractive segments within SAS Customer Intelligence 360.
2. Providing transparency for how campaign management processes can easily absorb algorithmic-defined segments and take action.
3. Bridging the worlds of analysts and marketing technologists.

Let's assume we're feeling confident about the results of our segmentation analyses. Now is the time to share the prescription with marketing teams who manage content delivery across consumer touch points. The audience segments from the analysis could be used for direct, email, web, mobile, or other interaction types.

To begin the transition, we simply need to score customer (or prospect) records with cluster or tree tags.

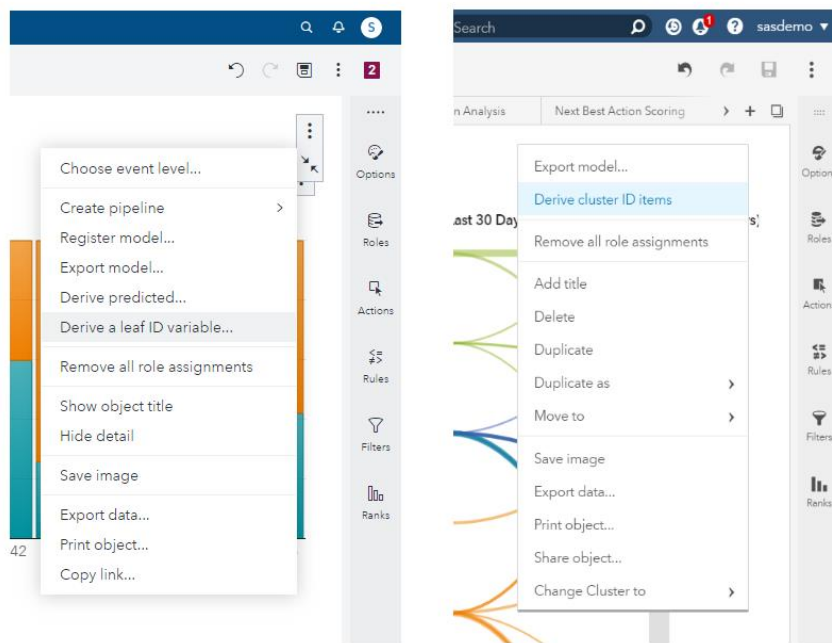


Figure 33. SAS Customer Intelligence 360 and SAS Visual Data Mining and Machine Learning – Segment Tagging

Here is an example of what the tagged data looks like for unsupervised clustering.

Customer ID	Visitor ID	Cluster IDs
10090536	13402096	1
10090160	13401713	2
10089896	13401445	3
10089800	13401345	4
10089722	13401265	4
10089532	13401073	4
10089443	13400983	3
10089265	13400802	1
10089242	13400778	2
10089098	13400634	1
10088953	13400488	4
10088946	13400481	4

Figure 34. SAS Customer Intelligence 360 and SAS Visual Data Mining and Machine Learning – Cluster Tagged Data

Here is an example of what the tagged data looks like for supervised decision trees.

Customer ID (count)	Visitor ID (count)	Segment ID	Predicted To Convert	Propensity To Convert
10090547	13401107	2	No	0%
10090534	13402096	20	Yes	27%
10090509	13402069	10	No	5%
10090496	13402056	19	Yes	17%
10090486	13402066	2	No	0%
10090457	13402016	27	Yes	69%
10090450	13402009	13	No	0%
10090442	13402001	2	No	0%
10090435	13401994	13	No	0%
10090428	13401986	2	No	0%
10090421	13401979	29	Yes	59%
10090414	13401971	32	No	0%
10090406	13401963	2	No	0%
10090387	13401944	10	No	5%
10090376	13401932	2	No	0%
10090371	13401926	37	Yes	69%

Figure 35. SAS Customer Intelligence 360 and SAS Visual Data Mining and Machine Learning – Decision Tree Tagged Data

Rest assured, there are different approaches other than using a table to making analytically-scored data available within (and outside) of SAS. What options do analysts have to help their marketing teams?

- the ability to target segments in batch or real-time
- access to the segmentation scoring engine (SAS, Python, or REST) for APIs through SAS analytic services.

With the segmentation **analysis tags now available for the marketer, let's revisit the segment map leveraging of the clustering scores that we looked at earlier in this paper.**

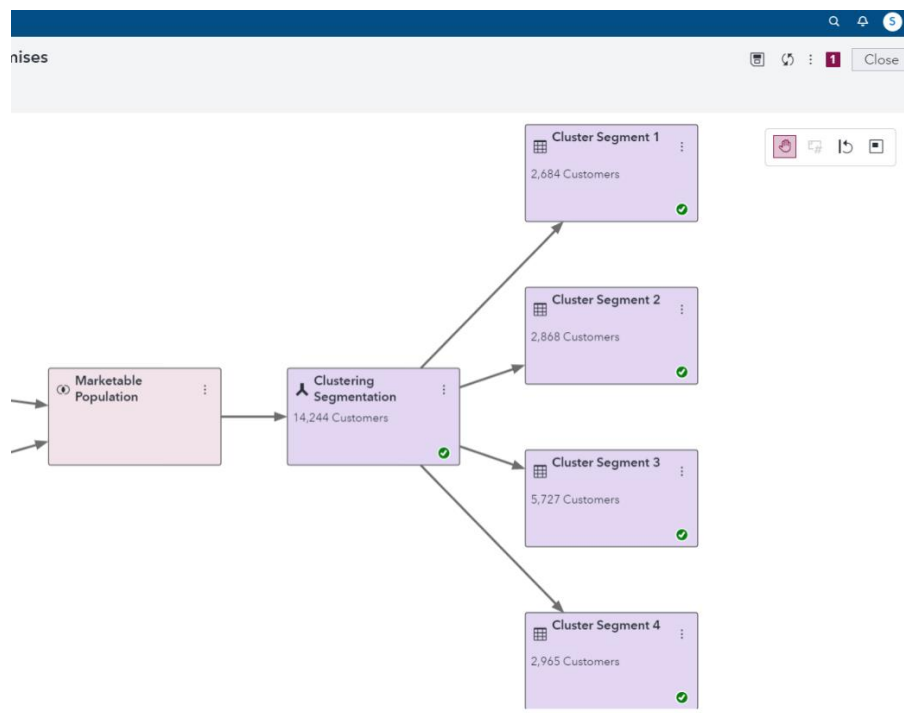


Figure 36. SAS Customer Intelligence 360 – Revisiting Segment Map to Focus on Clustering

To create the final step of this segmentation map, a split node allows us to leverage the analytical prescription.

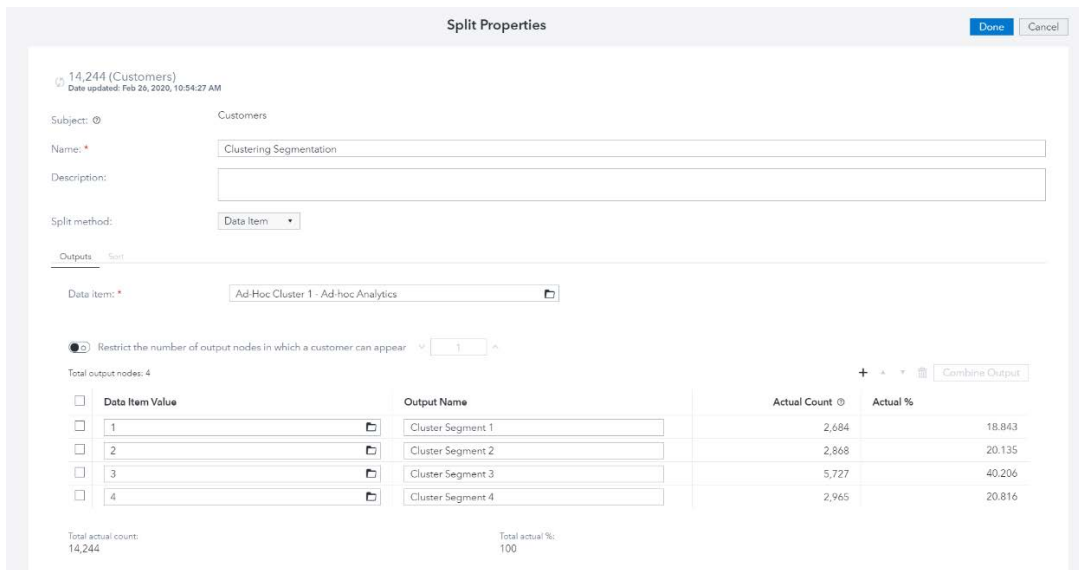


Figure 37. SAS Customer Intelligence 360 – Absorbing Cluster Segments Using a Split Node and Data Item

After the marketer has finished defining their targeting logic, we can schedule segments to run once or on a recurring basis. If your brand is using a third party (such as a mail house, print shop, or email services provider) for execution and delivery, we can choose the proper export template and send the output files with names, addresses and other personalized information directly from the SAS environment.

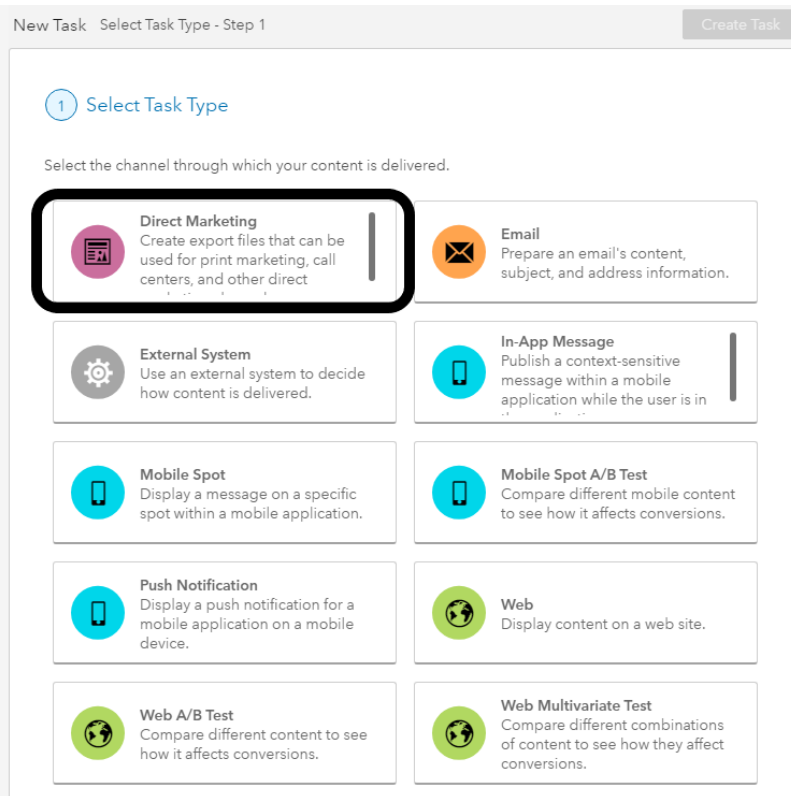


Figure 38. SAS Customer Intelligence 360 – Direct Marketing Task for Audience Export to Third Parties

None of your brand’s managed data ever enters the SAS Customer Intelligence 360 cloud. Likewise, contacts and responses can be captured and collected without requiring a pass-through in the cloud.

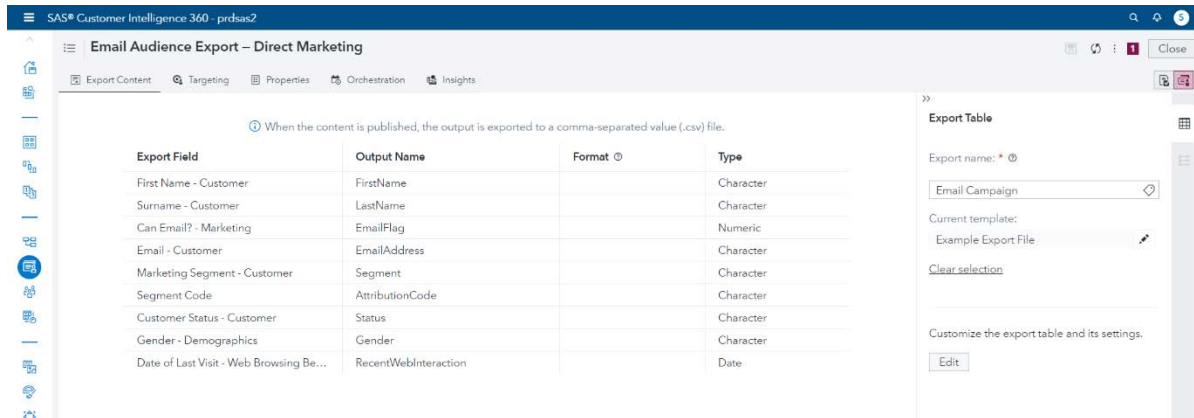


Figure 39. SAS Customer Intelligence 360 – Defining Audience Export for Third-Party ESPs and Direct Mail Letter Houses

To absorb the clustering-enhanced segmentation into the export process, we simply need to add the segments to the targeting criteria.

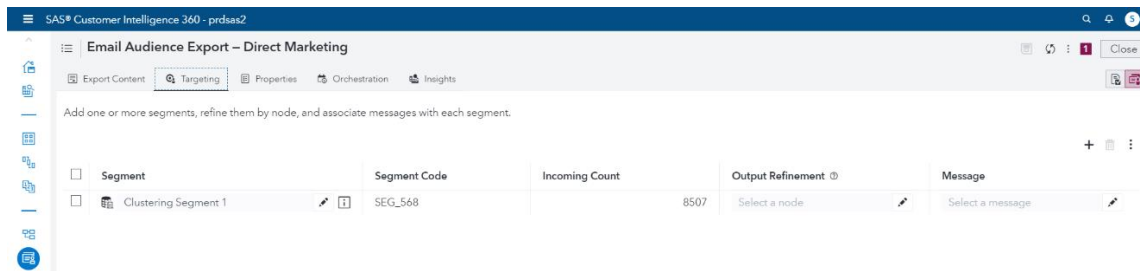


Figure 40. SAS Customer Intelligence 360 – Direct Marketing Task and Targeting Segments

Alternatively, SAS Customer Intelligence 360 **doesn't rely** on third-party email service providers (ESPs) and it can support email touch point delivery itself. The benefit is that contact and response tracking is immediately updated in the platform (as opposed to a 24- or 48-hour batch feed that your third-party partner sends back), and downstream personalization can benefit when customers interact with your brand across other touch points (such as web, mobile, call center, and so on).

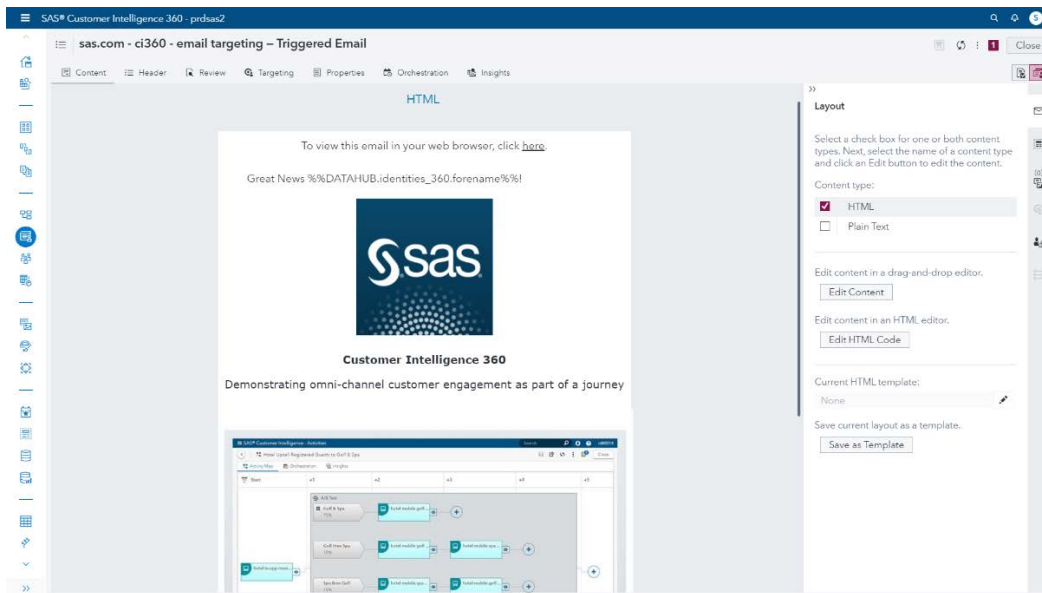


Figure 41. SAS Customer Intelligence 360 – Email Task

The impact of the hybrid marketing approach with respect to sending email assumes an address must be used by the sender. When SAS Customer Intelligence 360 is used to deliver email, a file is uploaded to the cloud that contains addresses along with any personalization parameters (such as customer name) required by the email template. Once the email is sent, the file is automatically deleted so that no personal data persists.

From a targeting perspective, it's important to recognize that a defined segment is available across any supported touchpoint (or task) within SAS Customer Intelligence 360. As in the direct marketing task example discussed previously, the cluster segments are available for the email task in a single click.

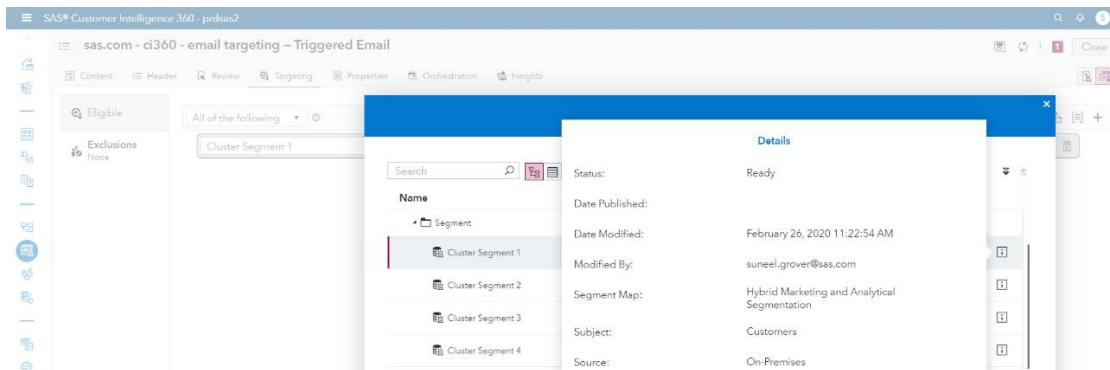


Figure 42. SAS Customer Intelligence 360 – Email Task Targeting

From a digital marketer's perspective, the additional customer insight that hybrid marketing provides is invaluable in terms of improving personalization. Let's discuss this value proposition in the context of customer journeys (or activity maps).

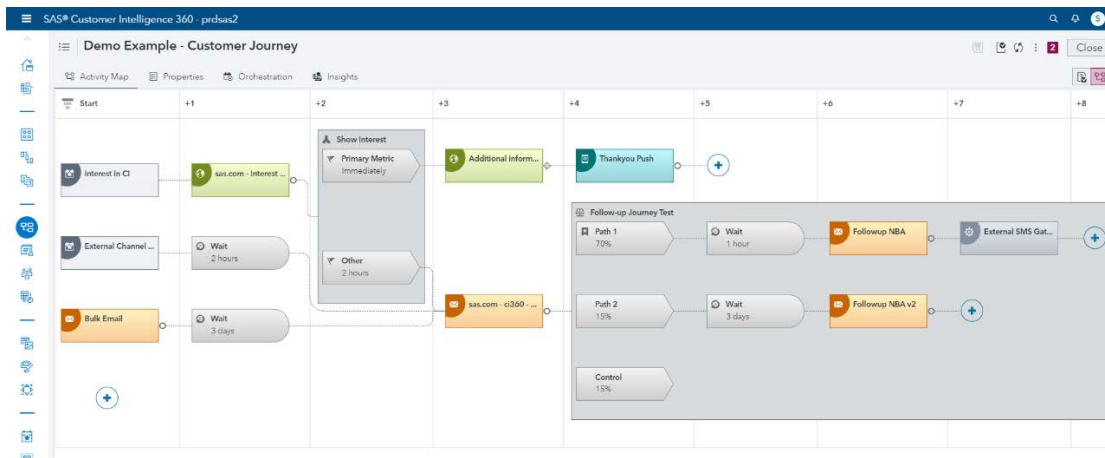


Figure 43. SAS Customer Intelligence 360 – Multi-channel Customer Journey Personalization with Activity Maps

This example depicts a coordinated series of web, mobile, and email tasks that are designed to meet the goals of a marketing campaign. An activity map uses tasks and events. It charts the customer journeys between tasks (such as sending a message through a channel) and the conditions (such as the primary goal and evaluation periods).

For example, you might use a web task to present an offer on your website.

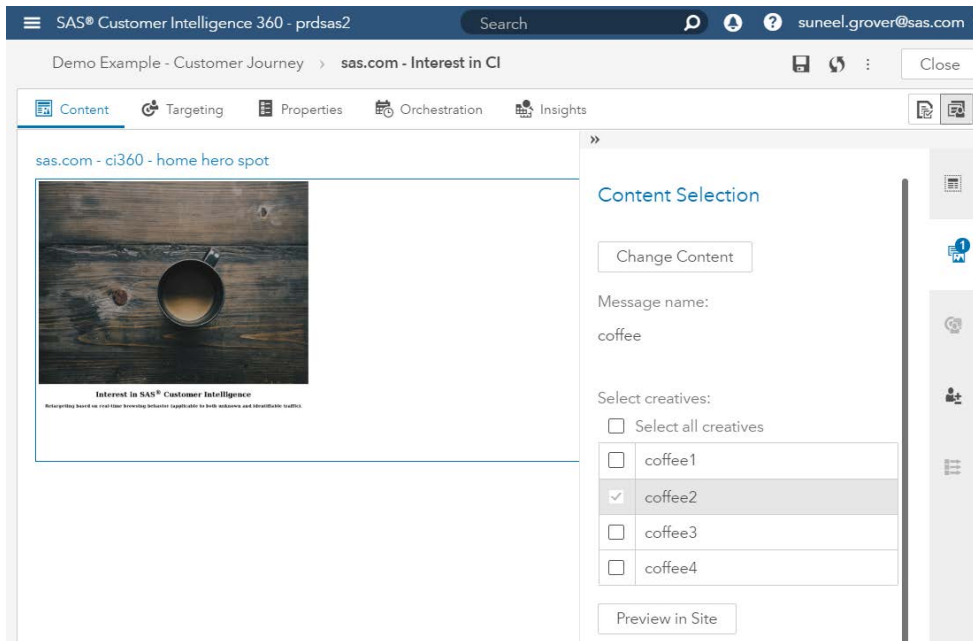


Figure 44. SAS Customer Intelligence 360 – Web Task

After allocating creatives for the interaction, the hybrid marketing value proposition surfaces under targeting.

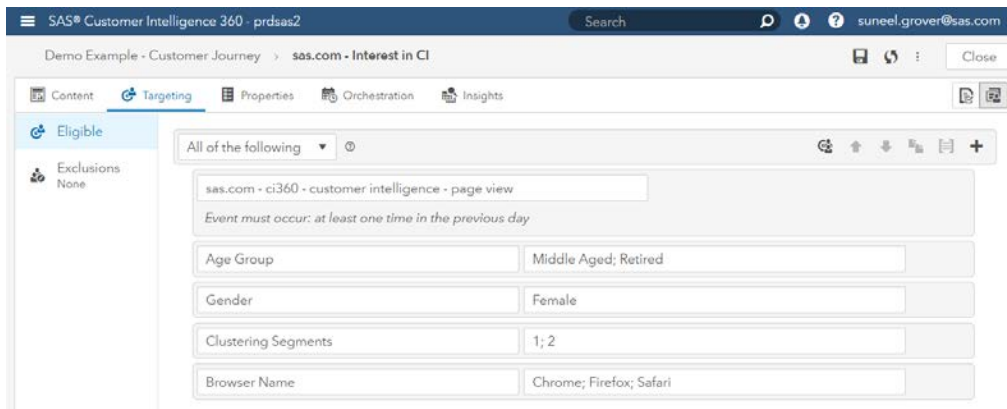


Figure 45. SAS Customer Intelligence 360 – Web Task Targeting

This information is available **at the marketer’s fingertips**:

- demographics from your managed data environment outside of the SAS Customer Intelligence 360 cloud
- analytical segmentation scores, web dimensions, and behavior stored inside the SAS Customer Intelligence 360 cloud

Coming back to the customer journey, we can use a mobile or email task to communicate a discount offer to all users who received an impression of the web task offer within the last **week but didn’t meet the macro-conversion goal**.

CONCLUSION

Allow me to close with a peek into the design principles of SAS Customer Intelligence 360, where the technology is intended to resemble the anatomy of the human brain. There are two distinct hemispheres.



Figure 46. SAS Customer Intelligence 360 – Design Principles

The left hemisphere is associated with analytical, logical, and fact-oriented thinking. The right side is associated with creative, intuitive, and visual thinking.

This translates to these factors:

- The strength of the left side links tightly with the authoring and deploying of predictive and machine learning models.
- The right side facilitates the orchestration layer of marketing activity across planning, creative, and operations functions.

Together the intent is to better understand and manage customer activity, regardless of **channel, in alignment with a brand's goals and objectives. At the end of the day**, both the analytical-minded and the creative-minded need to be in lockstep with one another. This is how the whole-brain approach of SAS Customer Intelligence 360 works.

Within this viewpoint, AI has the power to transform the world around us, and analytics is at the heart of delivering on this promise. SAS embeds advanced AI capabilities into the platform to support initiatives from start to finish. We have covered a great deal of ground in this paper, highlighting multiple examples of AI augmenting human abilities.

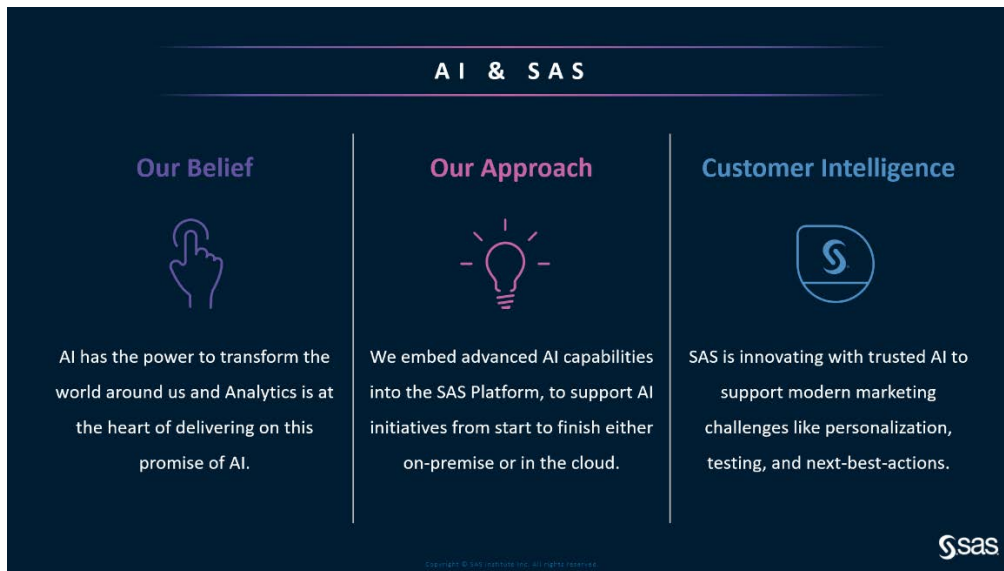


Figure 46. SAS Customer Intelligence 360 – AI Viewpoint

Against a backdrop of accelerating media and technology complexity, evolving privacy regulations, and increasing consumer expectations, hybrid marketing provides a **simple but powerful approach to address today's** martech ecosystem. You can turn insights into action by embedding AI within your marketing process to complete analytics' last mile and transform hype into reality.

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